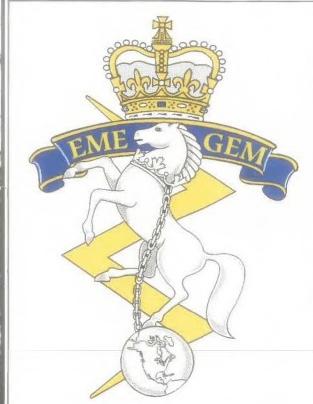




National  
Defence  
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nationale

# EME JOURNAL



**UNVEILED! General DeChastelain helps unveil the new  
monument during the 50th Anniversary celebrations in Borden.**

*Read all about it in the next issue!*

Canada

ARTE

# EME Journal



The EME Journal is the magazine of the Electrical and Mechanical Engineers, published at NDHQ under the terms of reference of the Director General Land Engineering and Maintenance and the EME Branch Adviser. The purpose of the publication is to disseminate professional information among members and exchange opinions, ideas, experience and personnel news, and promote the identity of the EME Branch.

The EME Journal depends upon its readers for content. Articles on all aspects of the Electrical and Mechanical Engineering System, photographs, cartoons, people news and comments are solicited. Readers are reminded that the Journal is an unclassified and unofficial source of information. The contents do not necessarily represent official DND policy and are not to be quoted as authority for action.

Contributors are asked to submit the original text typewritten, accompanied by a disk in WordPerfect format. Photos should be sharp, glossy black and white or colour prints with captions typed separately. Personnel should be identified in all cases, both text and captions, by rank, initials, surname, trade and unit.

The editor reserves the right to reject and edit any editorial material.

#### Send correspondence to:

The Editor,  
EME Journal, DLES,  
National Defence Headquarters,  
MGen George R. Pearkes Building,  
Ottawa, Ontario, Canada K1A 0K2.

Editor-in chief                    BGen V. Pergat  
Editor                              Col J.A.N. Nault

Production Editor                Maj L.M. Espenant (819) 997-7270

French Language Advisor        Marie Delisle

Associate Editors	FMC	LCol P. Read	202 WD	LCol J.A.R. Coulombe
	AIRCOM	LCol K.W. Kirkland	LETE	Maj D. Laffradi
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# Table of Contents EME Journal 3/94

<b>Former "Boy Soldier" Retires After 52 Years</b>	
<i>Capt(Retired) Johnston receives second-ever MND 45-year Service Medal .....</i>	2
<b>EME Soldier Mentioned in Dispatches</b>	
<i>MCpl Atkinson recognized for actions in Somalia .....</i>	2
<b>Finally, Someplace to Hang our Hats!</b>	
<i>11(Victoria) Service Battalion moves into a new building .....</i>	3
<b>Larose Park</b>	
<i>A park in the Golan is dedicated to Cpl George Larose .....</i>	4
<b>Total Force Training - The New EME Reserves</b>	
<i>Reserve trade structure and integrated training.....</i>	5
<b>DVEM to the Rescue!</b>	
<i>Palletized loading system provided to Former Republic of Yugoslavia.....</i>	8
<b>Computer Models Used in Maintenance Planning</b>	
<i>How ILS is used in the TCCCS project .....</i>	9
<b>An EME Farewell</b>	
<i>The trials and tribulations of packing up CFB Lahr.....</i>	13
<b>From Bullets to Ballast</b>	
<i>An EME officer risks life and limb to build his sailboat! .....</i>	19
<b>Accreditation and Certification</b>	
<i>The rules as applied to EME trades .....</i>	21
<b>DVEM to the Rescue Part Deux!</b>	
<i>ISO Container Handling vehicles provided to FRY .....</i>	23
<b>Ottawa Gets Fancy Paint Booth!</b>	
<i>Just in time for closure, 7 Wing EME Squadron opens new down-draft paint booth.....</i>	24
<b>The Horse "Mobile"</b>	
<i>Trenton builds a 50th Anniversary sign .....</i>	25
<b>What's Out There?</b>	
<i>Night observation demo at LETE .....</i>	26
<b>Capt Scuka's Quote of the Day.....</b>	28

## Former "Boy Soldier" Retires After 52 Years

Colonel Cody, the Base Commander of CFB Kingson, presents Mr Gordon Johnson with the Minister of National Defence 45 Year Service Medallion, for over 52 years combined service in the Canadian Forces and the Public Service. This was only the second such medal awarded!

Mr Johnson joined the apprenticeship program in 1941, and served with 3 Coy RCEME, 1 Cdn Sub-Workshop RCEME in England during WWII, 5 Tech Regt RCEME in Hamilton, ATOB Petawawa, and the RCEME School. Although he reclassified to PAdm in 1963, he retains close ties with EME to this day through memberships in the RCEME and EME Associations.



## EME Soldier Mentioned in Dispatches

Cpl DW Atkinson, a FCS tech from HQ Airborne Regt, was Mentioned in Dispatches recently for "intervention in diffusing a dangerous riot in Somalia". Well done!



# Finally, someplace to hang our hats!

by Captain Don Booker

**A**nyone who has been with the military for any length of time knows what it is like to go through the trauma of moving your entire existence time and time again in very short order. 11 (Victoria) Service Battalion has recently suffered such a fate, moving four times in the last three years!

Saturday 5 February 1994 saw the Official Opening of the Lieutenant-General E.C. Ashton Armoury in central Saanich by Brigadier General S.T. McDonald, CD, Reserve Advisor to the Commander, Land Force Command. 11 (Victoria) Service Battalion and 11 (Victoria) Medical Company now have a new armoury to call home!

Our old home, the turn-of-the-century Bay Street Armoury, was filled beyond effective capacity, housing The Canadian Scottish Regiment, 5 Field Regiment RCA, 89 (Pacific) Royal Canadian Air Cadet Squadron, 11 Medical Company, 11 Service Battalion, BC District Detachment, and other diverse spaces such as offices for the Royal United Services Institute, and unit museums and messes. The squeeze was on everywhere, and no exception was made for Maintenance Company.

The maintenance facilities at Bay Street Armoury could only be described as austere. Proper trades training facilities were non-existent. Work space was limited to three bays on the drill floor. The tiny space that served as a combined spare parts and tool crib area was not much bigger than the 1911-era stables it grew out of. As with everywhere else in the old building, office space was at a premium.

In order for Victoria's Army Reserve units to properly meet their training missions, more space with proper facilities was needed. A lot of the legwork involved in tracking down a suitable location was done by the late CWO Terry Tout, who retired from regular

service here some years ago. The team looked at three or four sites before determining which was the most suitable.

The project was approved by NDHQ in December 1988. The design phase was started shortly after purchase of the site in the fall of 1989, and was completed by the fall of 1991. In April 91 we moved out of the Bay Street Armoury in downtown Victoria, to the vacant Gray Beverages Bottling plant. In April 92, before renovations could begin, we had to move out of our Vanalman Avenue location, back to Bay Street Armoury, and into Work Point Barracks, where space was available while 3 PPCLI was serving overseas in Bosnia-Herzegovina. In May 93, when the PPCLI returned to Victoria, we had to move out of Work Point Barracks to Albert Head. Finally, in Dec 93, we started moving equipment back into the renovated armoury.

The new maintenance facilities in the LGen E.C. Ashton Armoury include five vehicle repair bays, one training bay, two large servicing bays—one equipped with a 14 tonne ramp hoist, a welding bay, battery shop, tool crib, spare parts room complete with a loading dock, company quartermaster stores,

company orderly room, control office, change rooms, tire repair area, and an area for the repair of small engines.

Separate from the main garage area, located next door to the weapons lock-up, up is the Ancillary Shop. The weapons Technicians and fledgling Materials Technicians share this rather large room. The fabrication machinery was not all out of storage for the opening, but this space will soon be properly equipped.

Now begins the time-consuming task of distribution account verification. Hopefully we can complete this task before we have to pack up for summer taskings, and begin preparations to host the Commonwealth Games being held in Victoria in August 1994.

*R.I.P. Although Chief Warrant Officer Terry Tout, who was instrumental in designing the renovations, got to see the nearly completed facilities in December 93, he did not live to see the official opening. Terry passed away on 3 January 1994 after a battle with cancer. His experience and knowledge will be missed by many. Arte et Marte.*



*The new home of 11 (Victoria) Service Battalion and 11 (Victoria) Medical Company, the LGen E.C. Ashton Armoury.*

# LAROSE PARK

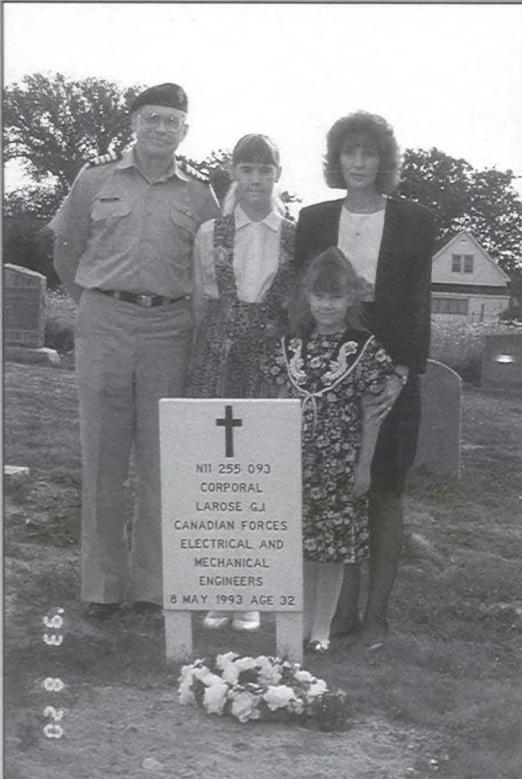
by Colonel M.C. Johnston

**C**orporal George ("Rosie") Larose passed away suddenly on May 8th, 1993 while serving as a member of the Canadian Contingent of the United Nations Observer Force (UNDOF). A popular member of the contingent, he had been posted to the Golan Heights from Camp Borden the previous March. After his death, the Base Maintenance staff at Borden pitched in and helped his wife, Sonia, and their two children, Tara and Ashley, move out of Borden and get settled in Porter's Lake, Nova Scotia. The Borden Maintainers also made a contribution to the 50th Anniversary Monument in his memory.

Meanwhile, his friends in the Golan, remembering that he was an avid sportsman, decided to name their sports field LAROSE PARK in his memory. They then made and erected a suitable sign at the entrance to the field.

Last summer I visited Corporal Larose's grave site in Hampton, Nova Scotia (not far from CFB Greenwood). I met Sonia and her daughters there, and my wife took a picture of the four of us at the grave site. This picture will be included in our EME Branch Honour Roll. A permanent, i.e. stone, grave marker will be installed. The Greenwood Maintainers will keep an eye on the grave site and ensure it is properly maintained and remembered. The Halifax Maintainers provide a contact point for any other help.

In the November 1993 Sentinel, there was a list of all of those Canadian Servicemen and



The Larose family with Colonel Johnston at the grave of Cpl Larose.

Servicewomen who had died while serving on Peacekeeping missions. The list mistakenly did not include Corporal Larose's name. Several of you told me this. I wrote a complaint to the editor. I also asked the Golan Heights Maintainers to have a picture taken of the park which would be published in the Sentinel. I received this in short order. However, the Sentinel is closing down. A small correction should appear in the last issue, but with no picture. So here it is.

As you can see, the Maintainers there took the trouble to have everybody in it. That, plus the way the Borden and now the Nova Scotia maintainers have helped shows the close family feeling that exists in the EME Branch. Sonia, Tara and Ashley plan to be in Borden for the opening of the monument. Well done all!

*Arte et Marte.*



Golan Heights Maintainers surround the newly-erected sign at Larose Park.

# TOTAL FORCE TRAINING: THE NEW EME RESERVES

by Capt Gregg Horne

**D**espite the common use of the phrase "Total Force", there remains a mystique as to what it really means. For many, it is simply a new name for the militia. The more enlightened understand it as the vision of what the army should be, how it should be trained, and what it will be expected to achieve. This article will describe the effect of Total Force on the training of EME reservists, in the context of reserve service battalions as part of the Total Force Army. As the article reflects to some extent the experiences and challenges within LFWA, a western army bias must be admitted. However, the themes of this overview apply throughout the Corps.

The Total Force army is a blend of regular and reserve soldiers working together towards the accomplishment of the same mission. It has been characterized in the past by concepts such as the "10/90 infantry battalion". In the face of ever-shrinking budgets and a growing capability gap, the importance of a fully capable and competent reserve force was seen. Simply put, the regular army would require augmentation to accomplish its mission, and the reserve army a transformation to provide this augmentation. A single unified force was to replace what were essentially two different armies.

Part of the development of the Total Force was the re-creation of a regional army command structure. Previously, 26 subordinate organizations reported directly to the Commander of the Army. With the reduction in span to four Areas, regular and reserve soldiers were brought under a single chain-of-command - an essential step in ensuring a common mission and equivalent standards. Other advantages of the reorganization were the reduction in the total number of headquarters and the streamlining of those that remained. Regular and reserve soldiers now work together at all levels, from LFC HQ to the units,

and the term "Regular Support Staff" has become part of history. These personnel have been posted into established positions within their reserve units.

Within the Area Headquarters, the application of the principles of Total Force at all levels of training and operations has been paramount. Total Force units have been created across the country, and are in various stages of growth. The reserve service battalions are experiencing a growing number of regular force personnel filling key training positions. The intention is to use these units to provide a significant portion of support to reserve units in garrison and in the field. This will allow a greater state of training at these units, and it will also allow more realistic training concentrations in the summer. Summer training is based on a training brigade supported by a service battalion formed from all reserve service battalions in the area. With capable technicians and an actual performance-oriented mandate, the battalions will be dramatically transformed.

The transformation of the reserve service battalions is based on the concept initially described by LCol Dave Redman during his tenure as G4 Maintenance Land Force Command. Essentially, there are three categories of support, ranging from meeting the basic needs of the service battalion alone to provision of a quality and capability of service comparable to a Regular Force service battalion. The major difference will be in the capacity that the unit can provide. The choice of which units will develop to which levels, and in which disciplines, will be dependent upon recruiting potential, support requirements, proximity to support bases, and the training missions assigned. The main concern to maintainers is that each service battalion will provide a framework for the training and employment of EME soldiers - craftsmen who will be trained to perform the same tasks as their Regular Force peers. The key element for the future success of Total Force, and

thus the army, is the development of soldiers who are capable of being employed in a range of activities, from garrison to operations.

It has long been noted that a reservist could not be trained to the same degree as the Regular Force soldier. This resulted in reserve soldiers who were simply not capable of performing all of the same tasks with the same competency as their Regular Force counterparts. This was especially true of soldiers in support trades. The reserve soldier was as motivated as his regular counterpart, but the training system (including training at unit level through to national schools) was not capable of training him to, and maintaining him at, the required standard. The limitations on availability imposed by reserve service were too restrictive. For example, in the vehicle technician trade, a regular force soldier receives three months of basic training, six months of QL3, 18 months of OJT, and another six months of QL5 - three years of training to bring the new recruit to a point where he can be responsible for his own work, with only limited technical supervision. For most reservists, the commitments of a full-time job or education prevent such extensive training. An alternative was needed to reduce reserve training time without reducing the reservist's ability to perform the same tasks as his Regular Force counterpart.

This has been accomplished by recognizing that under MITCP 85, the reservist was expected to learn the full scope of the regular force trade, but only in such depth as was possible in the available time. Once again for the vehicle technician, this meant that he became more an advanced driver-mechanic than an actual vehicle technician. The new Integrated Training Standards have remedied this situation, requiring the reservist to display the same degree of knowledge and ability, but reducing the number of tasks that he is required to perform. In effect, the reservist will be a

specialist tradesman (see table 1), whose trade might be viewed as being a sub-trade of the Regular Force counterpart. While this reduces the flexibility of any one individual, his unit should not suffer dramatically in scope if it maintains a suitable balance of craftsmen from different trades.

There have been indications that some revisions can be expected in the vehicle and weapons trades. Weapons technicians can be expected to have a single basic trade (small arms) and then have the opportunity to undertake one of the Occupation Specialty Qualifications that will cover the other trade areas. Two options are under study for the vehicle technician, one of which is similar to the option discussed for the weapons technician. The other option would be to have two basic trades. In either case, it is likely that recovery will become an OSQ in place of a separate trade.

The new structure does not neglect those soldiers who previously qualified under MITCP 85. They range in rank from Private to Chief Warrant Officer, and they have varying degrees of experience. A plan has been proposed that would allow qualifications obtained under MITCP to be converted to qualifications under the Integrated Trades Standards. In some cases, the administration of tests, similar to the regular force Skilled Trades Entry Program

**TABLE 1: EME RESERVE TRADE STRUCTURE**

TRADE	SPECIALTY	MOC
VEHICLE TECH	WHEELED	411A
	TRACKED	411B
	ENGR EQPT	411C
	AAGSE	411D
	RECOVERY	411E
W TECH L	SMALL ARMS	421A
	ARTY	421B
	AFV	421C
	SEC CONT	421D
	ELECT/ELECTRO	430A
FSC TECH	ELECTRO/OPTIC	430B
	OPTIC INSTR	430C
	WELDER	441A
MAT TECH	MACH	441B
	AUTO BODY	441C
	PAINTER	441D
	TEXTILE	441E
	SMW	441F

(STEP), might be required. This will allow all soldiers to advance on the same scale.

The proposed conversions are shown at Table 2. Some details remain to be resolved, such as the need to ensure appropriate technical ability at all rank levels, the need to ensure fluency in LOMMIS and the other administrative aspects of the EME system, and the assignment of authority to grant the various qualifications. While the chart below provides a good indication of the effects of conversion, some differences may result upon implementation.

While reduction in scope of training brings the achievement of qualifications within reach of most reservists, many are unable to attend extended courses. These difficulties have also been considered in the development of the overall EME trades training program. The longer courses can be taught in one block, or they can be broken down into shorter modules. Naturally, the more a soldier is available for training, the more he can learn and the faster he is likely to advance. However, for the dedicated but time-limited soldier, the module system will allow progression, albeit at a slower rate. The key is that both methods result in the same knowledge in the end.

The first Corps course that the newly-recruited EME reservist will undertake is EME Common. In LFWA, this course has been run at the unit level in conjunction with base maintenance workshop support. Funding for the course is supplied by LFWA HQ, maintaining

**Table 2: MITCP - INTEGRATED TRAINING CONVERSIONS**

RANK	OLD MITCP	NEW MITCP	EQUIVALENCY	NEXT
Pte/Cpl	BTT/STT	QL3/QL4	Nil	QL3
MCpl	STT	QL4	Pass test: QL3 Fail test: Nil	OJT4 and QL5 QL3
Sgt/WO	ITT/ATT	QL6A/QL6B	QL5	QL6
MWO			QL6	QL7

central control over the number and distribution of courses. The course requires eight training days, and is taught as a single block or on weekends. The purpose of the course is to provide the soldier with the history of the Corps and an introduction to the way it works today. It teaches the soldier what other craftsmen do in their trades, and outlines the basics about his own trade. In short, it provides the basic knowledge required by the new craftsman.

The soldier then goes on to complete QL3 training. This is an in-depth course taught at CFSEME. In the future, it may be taught at base maintenance workshops, but CFSEME will remain responsible for training packages and standards. This course is one of the cases where the training may be provided in a modular format.

Following completion of QL3, the craftsman must then complete OJT4 to gain hands-on experience. This teaches the soldier to apply the theory of his QL3 course to the technical problems that actually occur in day-to-day operations.

The OJT4 can also be personalized, although not in the same manner as the QL3. The preferred method is concentrated day-to-day exposure over an extended period. This has the benefit of reinforcing knowledge, exposing the soldier to a wider and more realistic variety of tasks, and completing his training in reduced time. However, for the soldier who cannot afford an extended training

period, the OJT can be tailored to meet his periods of availability.

All individual training conducted in LFWA, including OJT4, is provided by the Area headquarters upon identification of the requirement by the district headquarters. The district consolidates and prioritizes its nominations, and indicates the specific periods of availability. Area Headquarters does the same for the Area, and then arranges for the provision of training at an appropriate location, usually a base maintenance workshop. Reporting procedures are detailed by the Area Headquarters on provision of funding.

Over thirty soldiers have completed QL3 training, some of which have now completed OJT4. In the summer of 1994, several soldiers will attend QL5 training, which will be conducted in the same manner as QL3. This is a significant milestone as it represents the point at which the craftsman can work without direct supervision. In turn, this represents the point at which the reserve service battalions will be able to take on a significant workload.

EME reservists are being given realistic training that will allow them to perform day-to-day maintenance, a task that will soon be assigned to units. For the future, some other significant changes are likely, and these will affect reservists and Regular Force soldiers alike.

One of the major developments could be a complete review of the trade structure from the "bottom-up". This would involve identification of all tasks required in wartime and in peace. From this, identification of mobilization trades would be possible. In turn, reserve trades

would include one or more of the mobilization trades, and the regular trade, one or more of the reserve trades. Throughout, the same standards will apply. The key to this approach is that all trades are built from basic blocks, rather than chips of one large trade. This is similar to the battle task standards concept. This concept could also lead to the modularization of regular force courses, which would allow regular and reserve soldiers to attend the same course - the truest sense of the concept of Total Force training.

Other issues, such as reserve terms of service, job protection, and increased benefits, are also under study. These issues would affect the reserves as a whole, and since benefits will carry a large cost to the government, progress can be forecasted to be slow.

To conclude, it is clear that Total Force IS firmly in place and that the Corps has undertaken to develop within it. The Electrical and Mechanical Engineers are foremost in the Army in this regard. More reservists will be found alongside their regular force peers in the future. The training that is provided in the future will determine the extent of their success.

*Captain Gregg Horne is currently employed as G4 Maint Plans at LFWA HQ, where he began as G4 Maint Equipment in 1991. Prior to serving in Edmonton he was a platoon commander in Gagetown and Technical Adjutant, 3 RCHA.*

# DVEM to the Rescue!

In 1987 DND bought 39 Kenworth Palletized Loading System (PLS) vehicles and 39 Knight PLS trailers from the US Army. These vehicles augmented and/or replaced aging vehicles used to transport Military Engineer dry bridging stores.

The vehicles come in two variants: ECC 147106 (400 HP); and ECC 146106 (350 HP). Both vehicles have a 15-ton carrying capacity (the only differences being engines and transmissions), and both vehicles pull a 15-ton trailer. The following describes the 400 HP vehicle in service in the former Yugoslavia:

- a. Kenworth C520 6X6;
- b. Cummins NTC 400 turbo charged diesel engine;
- c. Allison HT 750 DRD 5-speed automatic transmission;
- d. Rockwell 20,000 lb front axle;
- e. Rockwell 44,000 lb rear axle;
- f. Michelin 14.00R20 XL tires (HLVW tires); and
- g. Multilift 15-ton PLS.

DVEM 4-4 LCMM staff, Mr Sloan and Mr St-Louis, were initially approached by LCol Al Price (DLES 2), and asked whether the Kenworth vehicle and its trailer could be used to transport 20-ft sea containers in adverse conditions, in all weather conditions, in the former Yugoslavia. Knowing how four of these vehicles had performed in Somalia, a "Yes, I'll stake my reputation on it" answer was given by the LCMM.

LCol Price, the EME officer who visits all the UN hotspots, was getting ready to visit the former Yugoslavia (he calls this type of visit a SAV, spelled by some as SWAN...) His team included many great and brave warriors, including the fearless DVEM Directorate Chief, CWO Floyd MacLean. Prior to departure, DVEM 4-4 staff briefed team members and loaded the team down with all the technical information and reports that they could carry.

When these fearless folks returned to NDHQ, they again approached DVEM 4-4 staff, serious about the possibility of this vehicle being deployed to the former Yugoslavia. From the time DVEM 4-4 staff got the go-ahead to the time vehicles were slated to be on the boat was about one month. During that time frame, the equipment had to be scaled for parts, placed in class "S" condition, modified, and painted white with UN markings.

To meet operational requirements, the following modifications were made on the twelve vehicles and trailers being shipped to the former Yugoslavia:

- a. Cummins "C" engine brakes (Jake Brake) were installed on every truck;
- b. Michelin 14.00R20 XL tires (HLVW tires) were installed on every truck; and
- c. Michelin XDL tires were installed on every trailer.

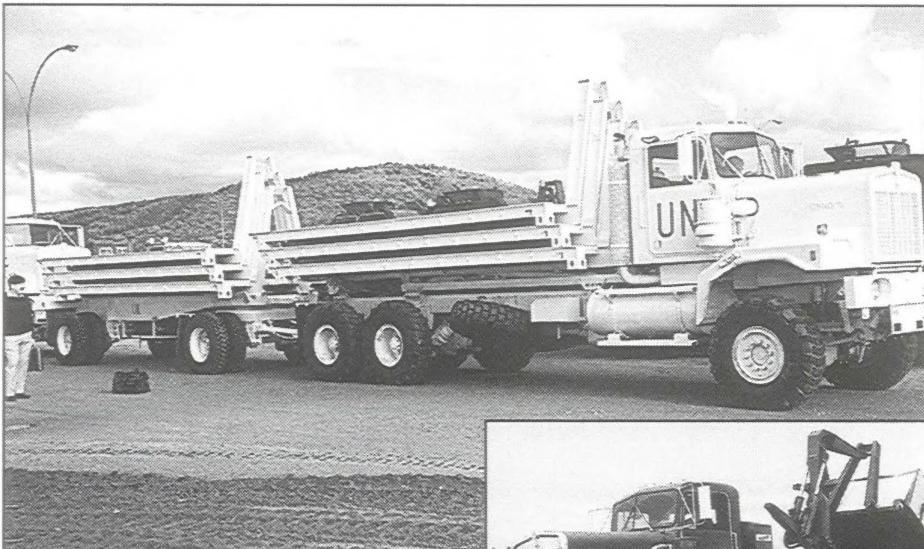
All military units and civilian firms

involved, when told of the urgency, ensured that all deadlines were met. There was fantastic cooperation from:

- a. 5 RGC (EET);
- b. 5 Bn S du C (Maint/Supply Cos);
- c. 3 CSG (Maint/Supply cells);
- d. LETE M Squadron personnel;
- e. NDHQ/DP Sup M 3-3;
- f. Canadian Kenworth Co;
- g. Michelin Tires (Canada) Ltd; and
- h. Cummins Ontario Inc.

The LCMM has been keeping his ear to the ground. We are led to believe that so far the vehicles and trailers are living up to expectations.

Based on the performance of these vehicles and trailers in Somalia and the former Yugoslavia, it is fair to assume that many off-the-shelf commercial vehicles in UN theatres of operations can be deployed and supported with little or no negative impact.



*The Kenworth Palletized Loading System vehicle and trailer as deployed in the Former Republic of Yugoslavia.*



*The PLS vehicle in action.*

# COMPUTER MODELS USED IN MAINTENANCE PLANNING

by Lieutenant C. S. Horrocks

## BACKGROUND

Project Management Office Tactical Command Control and Communication System (PMO TCCCS) and Computing Devices Company (CDC) signed the Iris System Contract on 18 April 1991. The contract includes specifications for CDC to conduct an Iris Radio System Integrated Logistics Support (ILS) program based on NDHQ Policy P3/87. The objective of this program is to provide to DND the basis for an effective and economical Iris Radio System life cycle logistics support capability. This capability is required to ensure that the specified Iris Radio System availability is achieved and maintained.

NDHQ Policy Directive P3/87, Integrated Logistic Support Policy, requires all Major Crown Projects for weapon and other equipment systems to have an ILS program. An effective ILS program includes two core features: supportability factors are considered in the equipment's design process; and, an analysis must be conducted to define the most economical and effective logistic support requirements to meet specified equipment performance objectives. In a structured ILS program, such as being conducted for the Iris Radio System, this analysis is called Logistics Support Analysis (LSA). It consists of a set of tasks which generate the information used to define and describe requirements for the Iris logistics elements. Examples of ILS elements include maintenance, supply support, technical data and training. (*Editor's note: more information on the ILS system can be found in EME Journal 1/94*)

## SCOPE

Maintenance planning is an important part of LSA. The objective of maintenance planning is to develop an opti-

mized support system based on the operational and maintenance requirements of the Iris Radio System, while ensuring the best balance between cost, performance and supportability. There are four maintenance planning tasks identified in the Iris LSA:

- a. Task C-301, Functional Requirements and Failure Analysis;
- b. Task C-302 Support System Alternatives and Initial Detailed Maintenance Support Plan;
- c. Task C-303 Task Analysis; and
- d. Task C-304 Trade-Off Analysis and Maintenance Plans.

The results of these tasks make up a major part of the Iris maintenance plans. All the data generated from the LSA tasks will be entered into a common relational database known as the Logistics Support Analysis Record (LSAR). The LSAR acts a central storage medium for all ILS data. Processed LSAR data is generated as reports. The Iris System LSAR includes 27 pre-defined reports and has the ability to produce ad-hoc reports. Earlier LSARs were flat-file databases, which could only generate predefined reports. With the creation of the relational database it is now possible to create additional(ad-hoc) reports, even after development of the database has been completed. This article will describe the analyses and models CDC will use to complete the Iris maintenance planning tasks. Two manual analyses and three analyses using computer models are described. The manual analyses are the Failure Mode Effects and Criticality Analysis (FMEA) and the Reliability Centred Maintenance (RCM) Analysis. The computer models are the Level of Repair Analysis (LORA), Sparing Analysis, and the Life Cycle Costing (LCC) analyses. The results of all models will be entered into a LSAR.

Failure Modes Effects and Criticality Analysis(FMEA)

FMEA is a manual analysis which identifies the corrective maintenance requirements of an item. It is conducted in accordance with MIL-STD-785 and MIL-STD-1629A on each Maintenance Significant Item (MSI). An MSI is a piece of software or hardware which will require replacement or repair as a result of a failure due to normal use or design. The FMEA documents all probable failures in a system, the effects of those failures on system operation, and ranks each failure according to a severity classification. The FMEA is comprised of a Failure Mode and Effects Analysis and the Criticality Analysis.

The results of the FMEA will be entered in the LSAR and will appear as LSA Report 20(LSAR-20), Failure Mode Analysis Summary, and LSAR-21 Failure Mode Detection Summary. LSAR-20 will identify the failure modes, failure effects, failure rates, failure probability and Safety Hazard Severity Code. Items which have high failure probabilities and a high safety hazard severity code will require design investigation. Design Deficiency Reports may result from these findings. LSAR-21 provides the narrative for failure detection, including immediate operator action to prevent secondary failures, and possible system restoration.

## Reliability Centred Maintenance(RCM)

RCM is the second manual analysis, and it identifies preventive maintenance requirements. Failure modes identified and put in priority by the FMEA will be used as input for the RCM logic. The logical process can be described as a decision tree consisting of 17 questions or decisions. The RCM logic determines if the item is critical for mission or operating safety, and if scheduled maintenance is feasible. It also identifies maintenance problem areas and provides justification for scheduled maintenance. The results will recommend

scheduled maintenance (such as inspection, calibration, or replace and overhaul), unscheduled maintenance, age exploration or redesign.

## Level of Repair Analysis(LORA)

LORA uses a computer model to determine if an item will be repaired or discarded upon failure. If the item is repairable the LORA will determine which line of maintenance should perform the repair. The decision to repair or discard is based on cost factors and is therefore purely economical. In recent years computer models have been developed which perform the mathematical calculations required by this analysis.

CDC will perform the LORA analysis using the DND model called ALORA IV. This model was developed by Directorate of Logistical Analysis (D Log A) to meet specific needs and requirements found in the Canadian Forces maintenance concepts. The original model, ALORA (Automated Level of Repair Analysis) was programmed to run on a Texas Instruments TI-59. It was not user-friendly and suffered several shortcomings. Several updates produced the current model, ALORA IV, which has overcome these problems and runs on an IBM-XT computer.

To be consistent with CF maintenance concepts, ALORA IV considers four lines of maintenance. The maintenance policy for an item may be any one of the sixteen possible combinations. For example it may be decided to repair the item using all lines ie. 1st, 2nd, 3rd and 4th or it may only be acceptable to go from 1st directly to 4th or any combination in between. The analysis will be run on an item-by-item basis for all items that will be maintained down to the smallest MSI. ALORA IV requires 55 data elements as input; some examples of input data are number of repair facilities, system life cycle, item unit cost, cost of entering an item into the supply system, initial documentation

cost, set up cost for first-line facilities, first-line support equipment cost, distances between repair facilities, contractor's flat-rate repair cost and labour rates. The model uses this data to calculate ten Iris support costs. Examples of these cost are documentation cost, set up cost, support cost, wages and transportation cost. The sum of these costs may be calculated for the sixteen repair options. The repair option with the lowest dollar value could be considered the preferred economic option. Sensitivity analysis can be run on the key cost drivers. This process is repeated for all MSIs.

The results of the LORA will be entered into the LSAR. A distinct LSAR LORA Report may not be generated, but the results will be included as part of the maintenance plan for each item. If it becomes desirable to view the LORA results separately this could be accomplished through the use of ad-hoc reports.

The advantages of using a computer model to run the LORA becomes apparent when one takes into account the number and duration of runs. However, there are several limitations with the ALORA IV program. One major drawback is that support equipment and set up costs must be apportioned. For example, if an expensive piece of support equipment is needed to repair an item, the ALORA IV may suggest discarding the item because of the high support cost. If this cost was distributed across all items which require the support equipment the support cost per item would be dramatically reduced, and the result may be changed to repair. A second drawback is that relationships between the equipment and their components are not tracked. This gives the possibility of recommending repair for a component although its parent was chosen for discard. Lastly, there is a lack of documented data required as input. To address this problem, available data is used to extrapolate reasonable values for the missing elements. These values must be used for all subsequent

runs to prevent inconsistent input data from biasing the results. LORA models have been developed which perform apportioning and track item relationships; however, these models only consider two lines of maintenance and are therefore inappropriate for use in the Iris System LSA process.

## Sparing Analysis

A sparing analysis is performed to determine the number of spare parts needed to support the equipment system, and which repair facilities should store them. The aim is to provide the most cost-effective combination of quantity and location which ensures that spares will be available when the equipment fails. Once this combination is determined, the number of spare parts calculated by the analysis may be used as a reference during spares procurement. The starting point of this analysis is to rate how effective the equipment system is for a given combination of spares and location. The method used to rate system effectiveness may be based on availability, back-orders, delay times or probability of accomplishing the mission. The name given to this system rating is called Measure of Effectiveness(MOE). The analysis first determines the MOE of a given spares allocation. An additional spare is added and the MOE recalculated. The difference between the two values, divided by the cost of the spare, termed pay-off per dollar, is calculated. The location of the spare is then changed and the new pay-off per dollar calculated. All possible locations are considered, and a pay-off per dollar calculated for each. The combination of spare and location which provides the best pay-off per dollar is chosen. Once this choice has been made, the sparing analysis increments the number of spares by one and notes the new location. The MOE is recalculated to include the new spare and location combination. The process is repeated to choose the location for the next spare. Spares and their location continue to be selected until the predetermined system effectiveness value or a dollar value ceil-

ing is reached. This method of sparing is referred to as marginal analysis.

The current DND sparing model is ROSAM 2.1 (Recursive Optimal Spares Allocation Model) and, like ALORA IV, it was developed by D Log A to meet the specific requirements of the CF. The origins of ROSAM 2.1 can be traced to the American sparing model METRIC. The ROSAM model has several strong points: the first is the ability to allocate existing stock so the maximum system availability is reached before new items are considered; the second is the choice of five different MOEs (operational availability, intermittent availability, probability of mission accomplishment, expected number of back-orders and expected delay time). As well, ROSAM can be used for one-item sparing at Initial Provisioning Conferences (IPC). The user is only required to input data for the one item under consideration, and not the entire system data. But the main advantage is the speed at which calculations are completed. This enables many alternatives to be considered for each spare. It is as a comparison tool which makes ROSAM so useful.

ROSAM results are entered into the LSAR, however there is no report that contains these results. As they are very important for IPCs, ROSAM results can be obtained via ad-hoc reports.

## Life Cycle Costing(LCC)

An LCC model has been developed by D Log A to calculate the life cycle cost and the operational readiness of equipment systems. The entire life cycle is considered, with emphasis placed on in-service life, since this is the longest and most costly portion of the cycle. The LCC model determines the final cost associated with different hardware, maintenance and supply support alternatives. This enables the user to determine the most cost-effective alternative. The LCC model also has an internal sparing routine which may be run as an option.

CDC will perform a life cycle cost study. The results of the LCC will include total life cycle costs and identify cost drivers, and will be entered into the LSAR. Like ROSAM, there is no LSAR Report which contains the LCC results, nor will they be included with the maintenance plans. The LCC results will, however, provide the basis for developing and recommending support system alternatives under LSA Task C-304. Requesting ad-hoc reports for the LCC is one way to ensure visibility of the results.

## INTEGRATION OF LSA COMPUTER MODELS

D Log A is currently integrating all three LSA computer models into a single program called Logistics Analyzer or LOGAN. LOGAN will include the ALORA IV, ROSAM and LCC models, a single database, a database management system (DBMS), a graphic-user-interface (GUI) and a data dictionary.

The DBMS will provide error-checking capability and simplify data transfer between other databases. A GUI will allow easier data input and correction as well as on-line help. In most cases the present data elements are specific to a single model. A data dictionary will make a single set of LOGAN data elements usable in all models and compatible with those specified by the United States Military LSAR database Standards, MIL-STD-1388-2A and MIL-STD-1388-2B.

The features incorporated into LOGAN would ease the process of running the LSA computer models. Adopting the MIL-STD formats for the data dictionary will provide an international standard for the data elements, and ease the transition of the results into an MIL-STD-1388-2A or 2B compatible LSAR.

## LSA for Software

The discussion to this point has dealt only with LSA analyses on hardware.

The technology incorporated in the Iris System makes great use of software. The Iris System Contract specifies that "... LSA tasks, plans, studies and deliverables equally apply to hardware and software.". The five LSA analyses discussed above must therefore be conducted on Iris System software. LSA on software is pushing the boundaries of ILS state of the art. While conceptually LSA should be applied to both hardware and software, detailed techniques need to be developed by CDC, as there is no currently-approved DND or industry standard on the methodology to conduct software LSA. Considering the amount of software being used, it is likely that system failures may be due to software failures, ie. design defects. The FMECA analysis must be able to produce corrective tasks which will enable the operator to identify the fault as software-related, as well as the procedures to restore the system. The approach the contractor takes to implement the LSA process on software will have a major impact on the Iris ILS program, and will be monitored closely.

## SUMMARY

There are five maintenance planning analyses used in the LSA program. The first two are FMECA and the RCM, which are manual processes. The FMECA identifies and specifies the corrective maintenance task, while the RCM analysis identifies and specifies the preventive maintenance task. The three remaining analyses are LORA, Sparing and Life Cycle Cost analysis. LORA determines if an item should be repaired or discarded at failure. If the decision is to repair the analysis will specify what line of maintenance should perform the repair. The Sparing analysis determines the number and location of spares needed to support the system to meet the system availability requirement. The results of the Sparing analysis may be a used as a reference during Initial Provisioning Conferences. The Life Cycle Cost analysis tracks the life cycle cost and the operational readiness of the system. In order to produce accu-

rate results these analyses must consider all possible combinations of repair options, sparing options and resources. This would be very time consuming if done manually. Fortunately the process is highly suited for automation. In order to meet this requirement three computer models have been developed by D Log A. The LORA analysis is performed by the ALORA IV model, sparing is performed by the ROSAM model and Life Cycle Costing analysis is performed by the LCC model.

LSA is applicable to both hardware and software. To date there is no known approved industry or government standard for performing LSA on software. This means CDC will be breaking new ground in order to accomplish LSA on Iris software. This is an area which will have a major impact on ILS, and is of crucial interest to the Iris Radio System.



CCUNPROFOR Maintenance Conference Held at Split, Croatia, May 1994  
L to R: Capt Steve Brown, G4 Maint; Capt Rob Dundon, Maint O CANLOGBAT;  
Capt Mika Gallinger, Maint O CANBAT 2 LDSH; Photo taken by Capt Ken  
Pettigrew, Maint O CANBAT 11 PPCLI.

WAR IS HELL!

# AN EME FAREWELL

by MCpl Joe(the Rat) Rato

**O**ne unavoidable element of military life is change. In service to our country, we as CF personnel face new challenges on a regular basis. We fully accept a variety of taskings in the work place, and on occasion the uprooting of our home lives. These are factors that come with the territory. During our careers, we will have met people who cope with changing environments better than others. Most of us, however, must at least concede that change and variety helps to keep life interesting, at times even exciting.

Change has most certainly been the name of the game played by EME personnel in CFE. Wrapped in its final phase of closure, CFB Lahr has become a tiny tot in comparison to the giant it was just two short years ago. Solid leadership, hard work, and large doses of innovation facilitated this metamorphosis. In the following paragraphs you will find examples of the challenges that were faced by EME personnel in effecting the reduction and closure of the once formidable CFB Lahr. Those who contributed to the closure will attest to the fact that, after twenty-five years of reign, this giant did not go quietly.

## MATERIAL PROCESSING CENTRE (MPC) INTRODUCTION

It quickly became apparent that, in order to reduce and eventually close all 4CMB units and CFB Lahr sections, vast quantities of eqpt would have to be dealt with. The EME and LOG worlds joined forces to confront this dilemma and produce specialized offspring like the MPC sect of B Sup.

Created in March 1992, MPC became the newest specialized member of the BTS branch. The section's initial tasking was to process all CFFET items belonging to 4CMB units. Due to the increasing number of tasks required to close the base it was agreed in July 1992

that MPC would also receive all B Sup material selected for return to supply depots in Canada. This included all dormant stores and Leopard rebuild spares. MPC transformed into a mini-depot, like an extension of 25CFSD Montreal. The sect was comprised of 4 major cells: Inspection, Receipt, Packaging and Warehousing. Due to EME personnel involvement, one of these cells and two other specialized shops warrant further discussion.

## MPC INSPECTION CELL

The first stop for material destined for Canada was the MPC inspection cell. Directed by a man as meticulous as Felix Unger (one half of the Odd Couple duo), WO TA White and his band of merry men delivered exacting technical support. They provided depot-standard material inspection and helped ensure that over 55,000 items (Feb '94) met a common and consistent standard. No slimy organisms were going to hitch a free ride to Canada either, if Terry and

his boys had something to say about it. Inspectors had to be alert for material requiring special handling. Radioactive equipment such as watches, compasses and beta lights were isolated from other items to prevent contamination. POL containers of all types were re-directed to the Base Firehall for purging prior to receiving the inspection team's stamp of acceptance. Equipment containing magnets underwent field strength testing, to prevent the possibility of having aircraft navigational equipment affected during transport. Their untiring efforts helped to ensure that clean, serviceable eqpt would be available to units back home.

## MPC WEAPONS SECTION

Streams of equipment were flowing steadily into MPC by June '92, and MPC weapons section members were literally up to their necks in it. Established in May 1992, they became the catalyst for repatriating Lahr's considerable weapons supply. The sect was



Busy at work inspecting Leopard parts are Sgt Werner Uetz, FCS Tech, and Sgt Dany Coulombe, Veh Tech.



The Weapons Section team poses in front of "The Vault" (left, from top) Bdr Bryan Linkletter, MCpl Clem Kelly; (right) Cpl Daniel Boulet, LS Todd Smackowdy and Cpl A.M. Parker.

lead by MCpl Clem "which way to CFB London" Kelly, and operated out of a former command bunker, appropriately dubbed "THE VAULT". It had 2 one-ton entrance doors and no windows. An amnesty point was quickly established to which departing units could make contributions "No Questions Asked." It was a deal many units could-

n't resist, but more on that in a bit.

Over 5000 weapons from unit accounts were turned in for inspection, preservation and eventual shipment to Canada. Every type of rifle, machine gun, mortar, anti-tank wpn and their related EIS passed through The Vault's steel doors. Not impressed yet? Back to the amnesty

topic! Over one hundred .30 cal GPMG barrels, twenty-three .50 cal MG barrels and a full range of breech blocks dating back to the Bren Gun were received.

Approximately \$1,000,000 worth of wpsns and associated components were safely returned to the system from never-never land. Clem and his team had no idea how successful the amnesty point would be, nor did they believe never-never land existed. They do now.

## MPC CARPENTER SHOP

The MPC Carpenter Shop's primary role was to build customized crates and containers for equipment processed by all other MPC cells. Operating under the leadership of WO Pierre "I prefer the hammer to the nail gun" Chaine, Mat Techs became veritable experts with a type of material not normally common to their trade...lumber. Turning out over 200 specialized containers a month, their efforts went a long way in preventing possible damage to equipment during storage and transport. New challenges arose in the crating of large radar and radio antennae, as well as sprung shelter components. Leopard power packs set the design pencils to work. Proper balancing of these components was of primary concern.

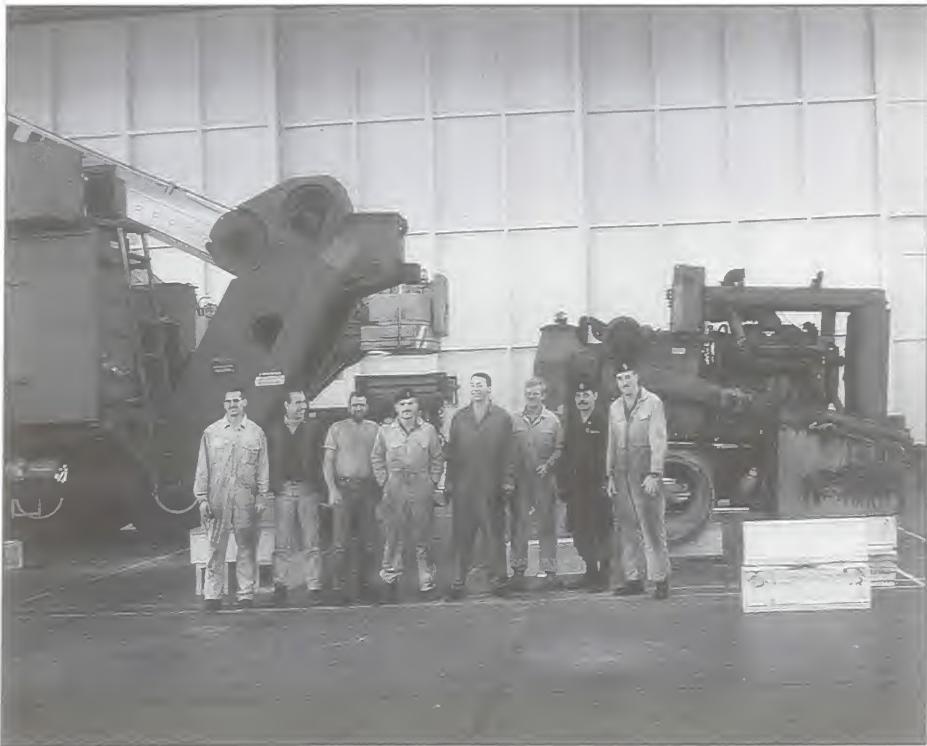
With the awkward but delicate nature of medical equipment, in-situ crating became a vital requirement at CFHE. Sect members were required to endure typical German weather and the occasional overpowering aroma of freshly-fertilized farm land to box up massive articles. These dedicated individuals always ensured their customers needs came before their own. All maintainers working at MPC took pride in their work, and it showed.

## NON TECHNICAL WORK-SHOP

While on the topic of lumber, perhaps now would be a good time to talk about



"Box 'em and ship 'em" say (clockwise from left) Cpl Mike Blais(Log), Bdr Scott Martell(RCHA), MCpl Andy Robichaud(EME), and Bdr Scott Johnston(RCHA).



The Crash Crane team (left to right): MCpl Mike Truscott, Herr Rainer Senftleben, Mr Jim Morrison, Cpl Raynard Pilote, Cpl Sylvain Bellrose, Mr Bob Bierman, MCpl Rick Barb, and Sgt Robin Wright.

the members of Non-Tech Workshop. At the head of this talented rat-pack is Sgt Laurier "Larry" Deschambault, a man whose love of HD motorcycles is undiminished by the fact that they leak oil. (Editor's note: I think that's why Hog drivers like them!) In direct support of CFB Lahr, he and his crew crated, repaired, refinished, re-upholstered and dunnaged everything from PMQ furniture to cluster bombs. Couches, wall units and dining room furniture came in old and went out new. More recently, Non-Tech contributed to a CE and CMTT joint operation to prepare for shipment CFB Lahr's two display aircraft; a CF104 widowmaker and a CF84 Sabre. The aircraft were destined for CFB St. Jean and CFB Bagotville respectively. After 25 years of dedicated service, Non-Tech Wksp will close its doors for the last time on 15 Aug 94.

### Base Maintenance Land (BML)

Closure-related challenges were bound to affect BML's routine operations and areas of responsibility. In reading the following examples of the more unusual taskings accepted by the unit, the previous observation may begin to sound like an understatement. Commanded by Maj GP McNeil and, more recently, by Capt JWJR Côté, BML's technical support had reached out to over 41 different units, sects, dets and orgs in Belgium, Cyprus, Holland, Germany and the former Yugoslavia. Hosting the largest concentration of EME tradesmen in CFE, and a broad range of technical expertise, the unit was relied upon heavily during closure. As BML and other units lost personnel and eqpt through repatriation, it became obvious that transfers of responsibility would have to occur. More would have to be accomplished with less.

In May 1992, the disposal of all scrap PMV's became the responsibility of BML's Vehicle Platoon. The unit assumed the third-line maintenance functions of 311 FMSU with the closure of that unit in July 1992. With it came accountability for the following: Tank

Transporter Faun (TTF) repair, European type vehicle(ETV) repair, Components section, rebuild of third-line components and the CFE technical library operation. That same month, the CFE Calibration centre transferred over, adding this function to B Maint.

Vehicle recovery began to take on a new perspective. In October 1992, the unit received a request to recover an American APC (M113) originally sunk in an APC swim training area for use by 4 CER combat divers. Working in conjunction with the 8CH Leopard ARV team and volunteer divers from the Lahr Scuba Diving Club, a recovery crew extracted the APC from the depths of the Baggersee. Word of this got around. Pretty soon BML maintainers and volunteer LSDC divers were recovering previously-owned Canadian vehicles from the Rhine River and local quarries. Apparently sunk to avoid the junk yard's scrapping fees, these vehicles were potential hazards to ships and dredgers. By the time BML had ceased operations, six vehicles had been recovered, and owners had been systematically tracked down and fined accordingly. They could ditch and run, but they couldn't hide! Over 871 other PMV's were scrapped through BML.

BML's Heavy Eqpt Maint sect was also busy. This sect's purpose was to support BTN by maintaining everything from grasscutters to refuelers. Runway deactivations directly affected these techs. Before they knew what hit them they were on their way to CFB Baden to dismantle and prep for repatriation a 60 ton crash crane named "Dino." They teamed up with the few remaining maintainers of CFB Baden to complete this arduous task. Having practiced on Baden's "Dino", the time came to attack CFB Lahr's crash crane. A pat on the back was received by Sgt "Rockin" Robin Wright and his crew for completing the task in record time.

In the meantime, BML's Ancillary Platoon was holding their own. Techs were not only contributing to base



*Vehicle recovery with a twist! Cpl Stephane Roy(Adm) and Cpl Michel Blais(MSE Op) from the Lahr Scuba Diving Club.*



*8CH training turret with stand preserved by the Leopard R&O team.*

reduction activities, but also to a few UN missions. In 1992, with the help of Vehicle Platoon, 401 vehicles and 1793 pieces of equipment destined for OP Harmony were inspected, repaired and painted in UN colours. A total of 315 vehicles and 11 pieces of equipment were processed for OP Cavalier. In March 1993, an urgent need arose for 7 Tow Under Armour (TUA) to be specially modified and sent to CCUNPROFOR. The 7 TUA required their exhausts modified for missile safety reasons, and mounting of the coax machine gun, which had been rebuilt at LETE for right-hand feed. It took the TUA MOD team from Ottawa and the combined efforts of BML, 4SVC BN, 3RCR and 1R22eR to ensure the task was completed on time. All 7 of the TUA had been stripped for return to Canada.

A Distribution Account equipment inspection team, lead by WO Jim "Not'tawa" Spencer, was created to simplify the procedure of returning DA items by DA holders. The in-situ inspection/repair service was a success because it eliminated the need to transport vast quantities of kit to BML for reconditioning. Once tagged by DA inspectors, kit was simply dropped off at R&D or MPC sects of B Sup for processing.

Ancillary Platoon's Wpns section was definitely smitten by the closure bug. Over 500 C-7 rifles, 100 9mm pistols and related EIS were inspected and preserved. To speed up other matters, the section was granted special authority for local disposal of security containers. At last count, 200 plus safes and cabinets had been processed. Many of these required forced entry procedures, since codes and keys had repatriated with their owners. Once Baden had closed up shop, all CFE engraving needs were re-directed to this section. The section engraving machine worked double time on plaques for CFE's remaining population. In the famous words of the sect I/C, WO Ken "I love my trade" Whitnall "we had the best darn coffee fund in CFE!"

The Leopard R & O team, now operating from BML lines, inspected, repaired and preserved 70 plus tanks which had been rebuilt for the CF by the German Government. This occurred as part of a reciprocal agreement between Canada and Germany.

Fewer customers forced CANEX to scale down operations. Towards the end remained. With no technical support available to the community, it was BML to the rescue! EME Techs received authority to do after-hour repairs in BML facilities to help remedy this shortfall. These services were widely used and appreciated by those who would have otherwise been forced to seek help on the German economy.

MPC section and Non-Tech Wksp were not the only B Sup sections relying on EME skills. Deep behind supply lines were 3 maintainers, attached to R & D sect from BML as tech inspectors. WO Fred "don't touch my coffee cup"

Bourgeois and his sidekicks worked inexhaustibly to inspect and process all non-serviceable kit returned from DA accts, Work Order returns and MPC rejects. They made the final decision on whether kit would (a) go to BML on 1020 D action (b) be sold to unsuspecting German bargain hunters at CADC or (c) make nice piles in scrap bins. Their tolerance levels received regular exercise in performing their duties. Units desperate to clear outstanding accounts often threw Fred and his boys a few curve balls. One CMB account holder turned up with 2 lumps of metal (a master cylinder and a carburetor) which were melted beyond recognition. The CF942 condition tags read "leaking" and "can't adjust idle." Handling 100 to 200 line items per day, each with their special quirks, was a challenge for the section. Fred was also authorized to certify purged items as safe for transport. On one occasion, Fred was requested to certify a generator at the airfield. Upon his arrival, he found it had already been



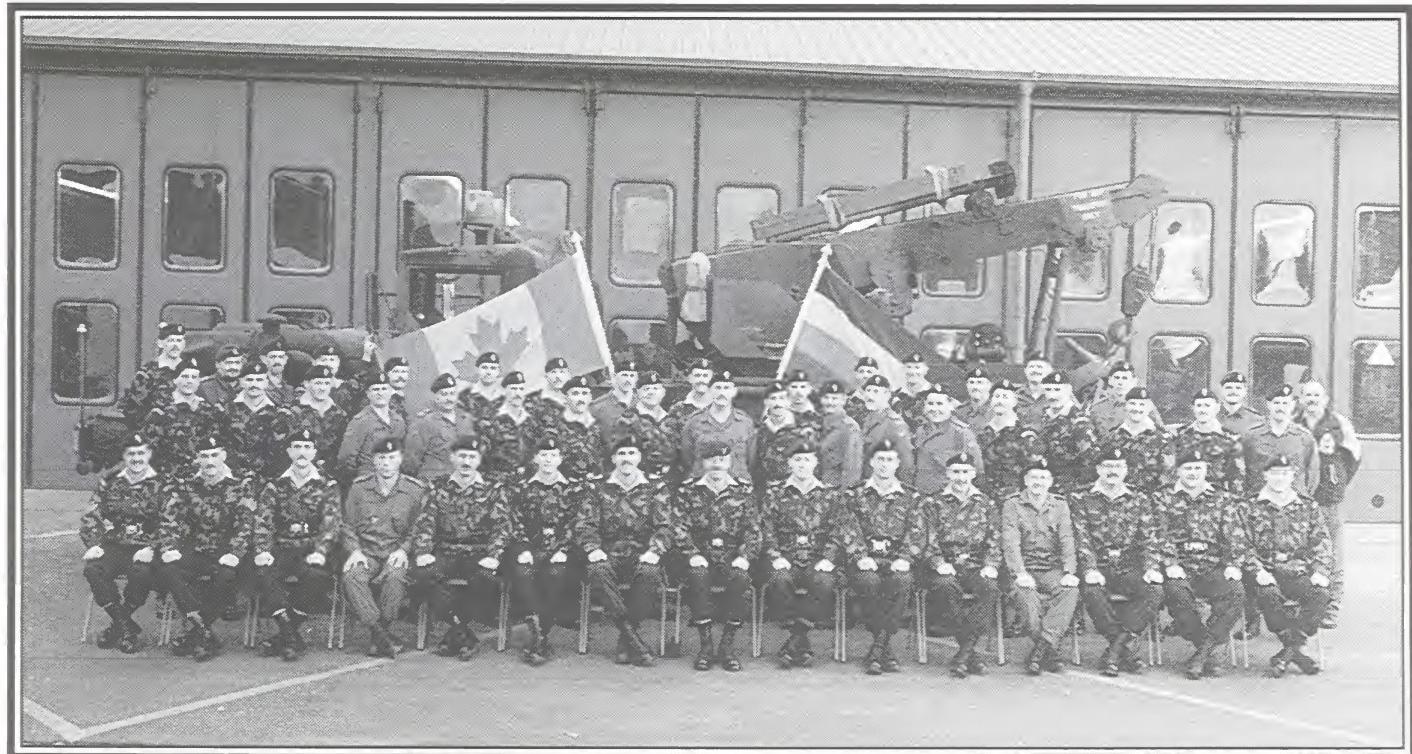
Herr E.A. Ammel receives thanks from BSO LCol Dave Redman for 22 years of dedicated service to BML Lahr.

loaded on a K-25 aircraft loader and was enroute to a CC130 Hercules. The pallet containing the generator had an assortment of other items on it, and was fully secured with straps and netting. Finding the generator and certifying it took real spider skill. Being the jovial sort, he had this advice for EME personnel: "if you ever have a chance to experience a base closure....DON'T!" Last report had Fred posted to CFB Edmonton. Isn't Edmonton slated for reduction this year? Good luck Fred!

## BASE TECHNICAL SERVICES BRANCH

The EME pers of CFB Lahr demonstrated the drive and dedication that our Branch has always been famous for. Although quantity could not be avoided while deactivating this giant, quality remained a priority. It wasn't always toil and trouble though. LCol "Super Dave" Redman, BTSO, Maj Arthur "I love my peanut butter" Hall, SLOO and all BTS branch CO's saw to that. They encouraged and supported extra curricular activity and kept troop morale high

through a somewhat sad period in CFB Lahr's 25 year history. Bonspiels, rotation dinners, and closure milestone celebrations gave remaining EME personnel good opportunity to put serious dents in Germany's schnitzel and beer supply. Our civilian employees, many of who have supported the Canadians since we pulled into town, are sad to see us go. They supported us well over the years and earned a place in our memories and in our hearts. Farewell Germany. Auf Wiedersehen CFB Lahr.



**The last EME members in Europe, CFB Lahr 1994:**

1st Row:- Sgt R. Lebouthillier, Sgt R. Wright, WO J. Mills, WO F. Bourgeois, WO R. Gagné, Capt S. Zientek, Maj A. Hall, LCol D. Redman, Capt R. Coté, MWO K. Stairs, WO P. St-Amour, WO T. White, WO K. Whitnall, WO J. Spencer, WO M. Haines.

2nd Row:- Cpl Y. Tremblay, Cpl R. Pilote, Cpl F. Rodrique, MCpl C. Gagnon, Cpl D. Bastien, MCpl B. Crowell, Cpl A. Roussel, Cpl B. Charlebois, MCpl C. Kelly, Cpl R. Titus, MCpl A. Robichaud, Cpl C. Stewart, MCpl B. Hollett, MCpl J. Steele, MCpl D. Chénard, Sgt G. Godbout, Sgt D. Dion, Sgt D. Coulombe.

3rd Row:- Cpl U. Carriere, Cpl G. Brassard, MCpl T. Burnes, Cpl L. Albers, MCpl D. Vance, MCpl J. Rato, Cpl A. Lewis, Sgt W. Uetz, MCpl D. Seymour, Cpl S. Renaud, MCpl H. Ehrenreich, MCpl D. Berquist, Cpl B. Firlotte, Cpl J. Martin, Sgt J. Belanger, Sgt L. Deschambault, Mr D. Stewart.

Missing:- WO P. Chaine, WO K. Steed, WO J. Vaillancourt, Sgt T. McLean, MCpl S. Dubois, MCpl M. Truscott, Cpl A. Carriere, Cpl B. Parker, Cpl T. Purvis.

# FROM BULLETS TO BALLAST

By Maj DB Parker

**F**or anyone who has ever wanted to have a large sailboat, but couldn't afford one, this article may interest you. Lack of money seems to be the only thing stopping dreams from becoming reality. My financial obstacle was overcome by purchasing a kit boat and doing the work myself. Not to fear, however, obstacles can be overcome. It was a beautiful mono-hull 31 foot sloop, and for only \$10,300! The hull was made in Barrie, and with an impending posting to Borden everything was lining up as it should.

Once I gave the company a deposit, things started to go wrong. The career manager cancelled my posting and kept me in Petawawa, the company went bankrupt, and I had visions of suicide. Three months passed and the company president surfaced with an offer to continue with the contract. With no possible chance of a refund, the contractor went ahead with the construction of the bare hull and deck. On the prescribed day just before Christmas I made the trip to the contractor for the final inspection. Things started to add up at that point. Transportation to Petawawa - only \$500. The lead ballast was extra. That would be a dollar a poured pound for 4300 lbs of lead and another \$500 transportation. "Oh, by the way", he said, in an off-handed manner, "I do not have any plans for the boat". In other

words, I would have to use his expertise in order to advance any work I undertook. Was the sucker stamp on my forehead that obvious? I paid him what I owed, and my vow to never see him again came true.

The boat arrived in a snow storm and took ages to off-load and put upright on its stand. The next morning I returned to find the boat on its side. Two days later it was back upright but the nose was almost touching the ground. What else could go wrong? I had the rest of the winter to ponder my plan of attack, as nothing could be done until the weather improved.

Where was I going to get \$5000 for the lead, and more importantly, how could I get the lead without having to go back to the contractor? Could I make my own ballast? Where would I get the lead and where could I get the plans? An article I read suggested a cast iron bathtub with 250,000 BTU road-tar heaters. Well at least I could buy a bathtub for \$5.00. Maybe I could build a forge with forced air and a heat source? Bullets! Don't they contain lead? After many hours of document research I submitted a letter to the Base Commander asking permission to dig bullets out of the ranges. As lead was considered to be a contaminant I figured I would be doing them a favour. It worked; I got permission. They allowed me to dig at an old abandoned range which was used from WWII to 1968.

Spring arrived, the ground thawed, and bullet sifting was started in earnest. In one month, I had 9000 lbs of bullets in 100-lb bags in the basement of my PMQ. People thought I was preparing for war. With that quantity of bullets, tests had shown approximately 50% of the weight of a bullet was lead - it would prove to be correct.

I was now ready to melt out the lead from the bullets. A fire-brick wall raised the bathtub about two feet off the ground. When forced air from a vacuum cleaner was directed into the fire under the bathtub, the melting worked like a charm. In two to three hours, 500 lbs of bullets was heated and released the lead. This resulted in the bottom of the bathtub getting cherry red. One thing I failed to make allowances for were the occasional "live" bullet. "Zing - hit the dirt" was a popular activity that summer. In any event, an old aluminium pot trapped the liquid lead, and 4300 lbs were thus processed.

Without plans I did not know where to put the lead in the boat. The local newspaper reported a sailboat sinking off Kingston. It was subsequently recovered and refurbished. The hull was identical to mine and was somewhere in Ontario. After some detective work I found it at the old airforce base in Picton. It was a dream come true, as the lead marks were prominent inside the hull.



The bare hull and cockpit pieces. Looks like a model boat!



Stoking the fire in the make-shift BMD.(Bullet-melting device)



Molten lead pours from the bathtub.



Digging the hole to form the ballast. The author is holding the 2 by 4.



The completed "Beaver-Boy"(less mast and rigging) is lowered into the water for the first time!

Now I had the dimensions of the ballast, as it was possible to make a pattern from the imprint in the hull. But what could be used to contain the molten lead? After a phone call and a visit to my uncle, the family foundry expert, I had all the answers. A mould made of 2" x 6" wood and a fire protection he called a "wash" (it looked like a thick paint with sand suspended in it) would be sufficient to contain the lead should the mould be buried in the ground to maintain its shape.

A month later, and a 400-lb mould in-hand, rumour had it this guy was actually going to turn bullets into ballast. It was going to be on the July 1 weekend. People who had said it was an impossible task were coming out to see.

The mould was constructed and buried as directed and 4300 lbs of lead was weighed out on bathroom scales and melted again in the bathtub. It worked; lifting the ballast via a hook in the top, it fit perfectly in the hull.

There was not an obstacle which could not be overcome once the ballast project was completed. It was only a matter of time, and it only took another 1000 hours during 12 months before the boat was christened. After three wonderful

years of sailing, I sold the boat and doubled my investment. It was a sweet reward. Oh yes, I almost forgot to mention the name of the boat. It was named after those heart-warming adventures ex-EME compatriot Freddie Parsons recollects when he was with the Van-doos in Tokyo during the Korean war. "Beaver-Boy", was her name. I never met so many single women whose mothers developed a sudden interest in sailing!

# ACCREDITATION AND CERTIFICATION

All service members, either nearing the end of their service or having subordinates nearing the end of theirs, should have a good understanding of the system and procedures available to obtain civilian recognition for relevant military training, skills, and experience.

The Canadian Forces has been working to have these military skills and knowledge recognized by academic, educational, and vocational institutes, and professional organizations and societies, such as Ahuntsic College, The Canadian Council of Technicians and Technologists (CCTT), and Provincial Technical Societies such as OACETT. A special part of the Second Career Assistance Network (SCAN) has been initiated to meet this goal, and is designed to help military personnel leaving the CF gain a competitive edge in the civilian job market. This initiative is the Military Civilian Trade Accreditation Program (MCTA).

Within the CF, a MCTA committee has been established to control the activities of this program. The committee is coordinated by Directorate of Personnel Psychology and Sociology (DPPS 5). DPPS receives advice and assistance from Branch Accreditation Committees established by the various Branch Advisors. DPPS then, in turn, advises the Base Personnel Selection Officers (BPSO), who administer the program. The BPSOs are provided, on a regular basis, with updated information in the form of booklets entitled "Catalogue of Equivalencies" and "Accreditation, Certification and You", which outline the following:

- a. Military occupations accredited at the civilian journeyman level;
- b. Military occupations accredited at the civilian Engineering Technician/Technologist - or other equivalent professional level;
- c. Interprovincial Red Seal program, related to civilian journeyman level;

- d. Specific Branch Occupation Accreditation Committee representatives; and
- e. Addresses and information concerning professional organizations and provincial apprenticeship/journeyman training programs.

Ontario Association of Certified Engineering Technicians and Technologists(OACETT)).  
Certification applies to an individual.

Thus it should be noted that accreditation is the process through which certification is achieved.

The licensing/certifying authority is normally one of the following:

- a. Apprentice Training and Journeyman Certification Branch - for provincially licensed Journeyman Trades, (Radio & TV Repairman, etc.). This branch also controls the Interprovincial Red Seal Program, which is designed to encourage the standardization of provincial/territorial training and certification programs.
- b. Provincially Chartered Associations/Societies - for registration and certification as Engineering Technician and Technologist; and
- c. Transport Canada - for federally-licensed Aviation, Avionics and Marine Trades.

These agencies conduct accreditation of training programs and courses. They assess military training, work experience and, if applicable, related experience, to determine the level of registration or certification possible. An individual may be registered as a Certified Technician or Technologist, or licensed as a Journeyman.

## Process for Accreditation of an Occupation

- a. A Branch, in our case EME through DGLEM, requests pre-evaluation through DPPS 5;
- b. DPPS coordinates with the relevant educational institute or society to conduct a pre-study of the selected occupation(s). Assistance from the

Branch Committee, to provide OSS, CTP, lesson plans, etc... and a school technical representative, is required during this phase. If the pre-study decides evaluation is worthwhile, a committee of three academic experts, three school instructors, and the Ahuntsic representative conduct the full Accreditation evaluation.

This process establishes a standard academic level/accord for the accredited occupation. When an accreditation accord has been approved, military training program graduates may then seek civilian certification. It is an individual's responsibility to apply for certification once the accreditation accord for an occupation has been authorized. An individual may apply for accreditation prior to an accord being granted, but it is then his/her responsibility to provide all required material for study by the society. Individuals may also be given extra credits based on their training, experience, and other courses they may have completed.

Many civilian occupations are carefully regulated by provincial governments or by chartered professional/semi-professional associations. These agencies normally issue a certificate to practice as a Licensed, Registered, or Certified Tradesman, Technician, or Technologist only after a comprehensive evaluation of the individual's academic, theoretical, and technical training and experience. Since each province and territory presently maintains its own standards, application for certification may be subject to a lengthy and complicated process. MCTA is continuing to work with professional and governmental agencies to facilitate and standardize the procedures for both Accreditation and Certification, and to establish, nationally, the military equivalent of civilian occupations or vice versa. Base Personnel Selection Officers and Branch Occupation Accreditation Committee

Representatives can provide advice on what agency to approach for certification.

## LEME ACCREDITATION HISTORY

Partial accreditation for the MOC 411, 421 and 431 Occupations through the Canadian Council of Technicians and Technologists (CCTT) dates back to 1978.

A pre-evaluation of the 411 MOC was conducted by Ahuntsic College in Jun 89. The unsatisfactory results indicated a very narrow evaluation was conducted, and no further action was pursued at that time.

## STATUS

Education Institute. The first step under the MCTA program for EME occupations has been initiated by DPPS with the signing of a service contract with Ahuntsic College, for a pre-evaluation of the MOC 421, 441 and 430 Series Occupations. The pre-evaluation has been completed, and involved the Ahuntsic College representative reviewing applicable training documents at CFSEME. The full evaluation will be conducted during 5 days in Jul 94.

Discussions to have the MOC 411 occupation pre-evaluated again, or given a full evaluation based on the results of the 1989 pre-evaluation, are on-going between DGLEM, DPPS, and Ahuntsic College.

National/Provincial Technical Societies. CCTT accreditation was requested for all MOC 400 Series Occupations through DPPS in May 93, and has been approved by CCTT. This is presently on-going and is forecast to be completed by summer 94.

## SUMMARY

Time has a funny way of catching up with us and, as we search for a second career, many will find our military train-

ing and experience unclear to prospective civilian employers. These employers do not have the resources to fully assess the qualifications and competence of job applicants. Therefore, they use the established standards of Licensing and Certification to determine competency levels. More and more employers are demanding certification as a job requisite. Certification guarantees that an applicant possesses the equivalent in academics and related work experience to allow a prospective employer to use these levels of certification in determining salary and wage categories.

In addition to the benefits gained by the retiring members, senior EME management supports the MCTA as a means of attracting highly qualified personnel (STEP) into the CF, and of retaining current members seeking to advance themselves in their respective occupation. If our existing members see that they can gain the necessary skills and experience for certification while a member of the CF, they will be less inclined to release in order to obtain those criteria.

MCTA for the EME occupations is also beneficial in ensuring continued enrollment of trained personnel for the Total Force integrated technical occupations within the EME Branch.

MCTA is part of the SCAN program, and was specifically designed to assist retiring military members in their transition to civilian second careers. As a second career assistance, MCTA enables prospective employers to equate and relate your academic standing and work experience to that of known civilian standards.

Additional information and assistance can be obtained by contacting your BPSO or Branch Accreditation Committee.

# DVEM TO THE RESCUE PART DEUX!

Finally, after a six month waiting period, we have authority to convert 4 Zettelmeyer High Speed Front End loaders with Armoured Cabs to ISO Container Handlers in the support of UN operations in former Yugoslavia!

This 4x4 articulated vehicle can be converted from its original configuration to a forklift ISO Container Handler vehicle within 10 hours. Once this conversion has been completed, the vehicle can lift, move, and stack two-high the NATO Standard container: 20 x 8 x 8.5 ft/20000 lbs. Or the operator can move the forks into position with a switch to lift, move, and stack normal pallets.

With this type of vehicle conversion, the Transportation Officer/CO will have much greater flexibility to complete his tasks.



*The converted Zettelmeyer ISO Container Handler.*

## OOOPS!!

Sharp-eyed readers will have noted that the cover of the last issue declared "Read about the last CFE EME birthday celebrations in the next issue". So here it is (the next issue), and where the heck is the promised article? Unfortunately, yours truly mis-counted the number of issues remaining before the 50th Anniversary Special Edition when drafting the text for the cover in question. The next issue (Edition 4/94) will, of course, contain all you ever wanted to know about 50th Anniversary birthday celebrations, including those in CFE.

## Funny Story Contest Update

You will also recall that I promised to publish the winner of the Funny Story Contest in this issue. However, responses are just starting to trickle from the pens of authors into my office, so I'll wait until Journal 1/95 to declare a winner. Send those stories in!

# OTTAWA GETS FANCY PAINT BOOTH!

by Sgt G.S. Dzoeba

**D**uring the past several years, an on-going analysis of the safety, cost, and productivity of vehicle painting has proven to be quite a controversial subject. Identified as deficient in these studies was the EME Squadron paint booth located in Hangar #4.

The primary purpose of a paint booth is to provide a clean, safe, well-illuminated, and well-ventilated enclosure for painting. It isolates the painting operation from dirt and dust while controlling over-spray and solvent vapours. New paint booths are scientifically-designed to create proper air movement, provide necessary lighting, and isolate the painting operation. In addition, their construction and performance must conform to federal, provincial, and municipal codes.

With all the information available on design specifications, EME Squadron embarked on the complete re-modelling of one of its existing paint booths. A project that started in July 1993 has finally come to the final stages of completion.

The down-draft design is known as the best way to eliminate over-spray, provide improved painter safety, and give the best possible paint finish. Air flows from overhead filters, wraps the vehicle in a high volume of clean, warm air, and is drawn out through strategically located paint arresters. This down-draft pulls the over-spray under the vehicle into a pit.

The system employs three specific modes of operation: off, painting, and baking.

- a.In the off mode, a controller modulates booth temperature to a fixed 55°F;
- b.In the painting mode, the booth temperature is maintained at 21°C (operator controlled); at the same time, air filter and paint arrester filters are monitored. Should booth



*The interior of the new paint booth at 7 Wing.*

pressure or filter conditions deteriorate, an alarm light will indicate the need for replacement or servicing; and

- c.in the baking mode, the booth temperature is maintained at 54°C (operator controlled), and the monitoring is the same as in the previous mode.

Since painting and baking are done in the same location, there is no need to move the vehicle. To initiate the baking mode, the operator simply flips a lever, then selects the temperature and time. Throughout both painting and baking modes, only highly filtered air is used. The vehicle is not exposed to the dust-laden air of the material workshop until the paint surface is hard.

To summarize, the obvious advantages in the design and control of this modern

paint booth are that the downward air flow draws over-spray away from the breathing zone of the painter and provides a far healthier, more comfortable working environment. It also eliminates the need to move the vehicle when wet, it suspends air flow across the vehicle, it stops slow curing of fresh paint film, and it reduces the exposure of the vehicle to dust-laden workshop air.

As this newly-installed system becomes fully operational, it will be both cost-effective and highly productive in the era of cost-saving measures.

# THE HORSE "MOBILE"

by Maj Rick Johnson

Once upon a time on a blue Base far, far away, near a little town called Trenton, the OC EME Squadron and the ETSM sat ruminating together with their Production Superintendent. "Why haven't the troops gathered round the flag and boosted our "cause-celeb" into the lime-light? Where is their esprit-de-corps when the Branch needs them? Look at the front of this workshop, it's drab and unappealing. CE won't re-paint it - lack of funds or something. We started the RCEME 50th Anniversary ball rolling in 1992, and still there's no rush out there to celebrate our Branch achievements and show the stuff we're made of." Sadly, the three wise men shook their heads... then... an inspiration.

"I want a sign with our horse on it out in front of this building!" cried the OC. "Make it happen!" urged the ETSM. "Consider it done!" echoed the Production Superintendent. And with those inspiring words began the creation of a novel, new approach, and the birth of CFB Trenton's horse "mobile" (pronounced "Mow-bee-eel").

Cpl Mike Orford and Ian Mackie at first were innocent bystanders to this dramatic "I want" from the OC.

Their concerns were centred on true matters of workshop production: burning fossil fuels and electron spin. Then arrived the Production Superintendent, his drill boots crackling loudly as he approached across the workshop floor. "Mackie, Orford, front and centre!" he bellowed, "The OC wants a sign in front of the workshop by tomorrow morning at the latest (notice this liberal interpretation, folks). You two get to work on it... don't ask silly questions and no extensions. I want your design ideas in colour no later than yesterday. Got that? Good, get on with it, you're wasting time!"

Long into the night they laboured and sweated. Loudly rang their hammers on



Cpl Mike Orford and Cpl Ian Mackie with DGLEM, BGen Pergat, and the result of their labour.

the unbending steel frame while the blinding sear of their torches melted the joining supports. Deep into the night, as the moon and stars circled the heavens above, they toiled over their monumental task. Their cries of pain and pinched fingers were muffled by the roaring blaze of their torches and the nerve shattering rhythm of their power tools. By dawn, with their last grain of energy almost spent, their work began to show the promise of a new age; yes, a new era in workshop propaganda was born that day at CFB Trenton.

"Call the OC!" cried Orford. "Bring the ETSM!" joined Mackie. The workshop staff rushed to the OC's office crying in unison "come forth, oh sir, and see!" The OC downed his donut and gulped his coffee. Stridently, he stepped onto the workshop floor. "First time in three months", someone muttered. Boldly, he crossed to the back room where lights blazed on the new creation. The OC gasped, he paused in awe, then he spoke. "Eureka boys, you've done it!" A cheer rang through the shop and so heralded in a new age, a new beginning, to CFB Trenton's celebration of our Branch's anniversary. Soon the world heard and marvelled at our boldness. Word was

received at the office of our fearless leader (the DGLEM, of course) who sent forth emissaries (the Branch CWO, naturally) to seek out these simple folks with so great talent (Mike and Ian, in Trenton).

The dawn of this new age of novel ideas and inspiring work was pronounced in early October 1993 in the National Capital Region. At the invitation of our bold leader (who do you think!) Mike and Ian sallied forth to the sterile halls of the Louis St Laurent Building and humbly declared themselves before the Magnificent One who loudly proclaimed their talent, their esprit-de-corps, their high initiative, and their unyielding dedication towards EME. Quoth he "This sign will be proudly displayed in a number of locations throughout the National Capital Region during 1994 as a demonstration of our talent and commitment to excellence in our work".

Well done Mike and Ian!

# WHAT'S OUT THERE?

**O**n 9 December 1993, DLAEEM sponsored a Surveillance, Target Acquisition and Night Observation (STANO) demonstration for LCMMs, PMO and DLR staff at LETE. LETE was tasked with the demonstration administration support, and it is safe to say that without their support the demonstration would not have been feasible, or as successful as it was.

The aim of the STANO demonstration was to reconfirm the capabilities and deficiencies of the in-service STANO equipments. The secondary aim was to display advances in STANO technologies from selected contractors (SPAR Aerospace, Allied Signal Aerospace, Magnavox, Motorola and Electronic & Space Corporation). In this context of the demonstration, STANO equipments were restricted to small arms image intensifiers, man-portable thermal imagers and ground based man-portable radars. However, it soon grew to encompass ground-based radars and then contractor equipments. The demonstration was attended by about 100 personnel from DLAEEM, DVEM, DACME, PMO LAV, DLES, DLR, DASP 5 and various others.

The following equipments were assembled for the demonstration:

- In-service image intensifiers such as the AN/PVS-501, 502 and 503. The newest image intensifier AN/PVS-505 (Pilkington "KITE" sight), which was purchased for CCUNPROFOR, was also on display;
- The in-service NODLR, AN/TAS-502, which is a 8 to 12 micron Infrared Band thermal imager;
- SPAR Aerospace displayed a remote version of the NODLR which allows the NODLR's control functions and display to be remoted up to 200 meters away from NODLR itself. The remote also has

a pan and tilt assembly for remote scene scanning;

- The in-service AN/TAS-4A, TOW night sight, which is a 8 to 12 micron Infrared Band thermal imager;
- Allied Signal Aerospace displayed the COBRA, which is a 8 to 12 micron Infrared Band thermal imager. There were two COBRAs on display: one in a tripod configuration and the other mounted on a JAVELIN;
- MAGNAVOX lent DLAEEM 4-4 the MAG-600, which is a 3 to 5 micron Infrared Band thermal imager. Personnel were able to compare performance between 3 to 5 micron and 8 to 12 micron Infrared Band thermal imagers;

• The in-service AN/PPS-15A X Band ground-based radar which was purchased in 1976;

• Motorola displayed the MSR-20A X Band ground-based radar. This radar is being considered by CDC for the GM LAV-25 surveillance suite which PMO LAV will purchase. Also, the MSR-20A may be considered as an replacement for the AN/PPS-15A by the LCMM in the future;

• Electronic & Space Corporation displayed the MSTAR Ku Band ground-based radar. This radar is being considered by CDC for the GM LAV-25 surveillance suite which PMO LAV will purchase. Also, the MSTAR may be considered as an replacement for the



Motorola personnel setting up the MSR-20A ground-based radar. The NODLR is just visible on the left hand edge.



*Electronic & Space Corporation personnel briefing on the MSTAR ground-based radar display and capabilities.*

AN/PPS-15A by the LCMM in the future;

- Various day optics were on static display by DLAEEM 4-4 LCMM staff. Such items as the C79 day sight, Unertil sniper scope, M22 binoculars (the proposed C1 binocular replacement) and light weight binoculars for the Infantry; and
- Various individual soldier camouflage nets were on static display from DACME.

The STANO demonstration was broken into a static display, general briefing and

a free-form equipment display. The equipment display was conducted in two sites on the LETE Proving Grounds using various equipments as targets. The first site was used to show how thermal imagers and radars could be used to complement each other. A radar, using a wide sweep, could be used to detect a moving target and then the thermal imager could be used to identify it. There was a static LEOPARD MBT at 1500 meters and a moving ILTIS as targets. The second site was used to show the performance differences between image intensifiers and thermal imagers as well as the difference in performance between 3 to 5 micron (MAG-600) and

8 to 12 micron (COBRA) Infrared Band thermal imagers. There was a static APC at 500 meters as a target.

The STANO demonstration gave all personnel the opportunity to view and handle both in-service and selected contractor STANO equipments. The demonstration was a success: the weather cooperated, the LETE mess was open, and the equipment worked as planned.

#### ARTE ET MARTE

## Capt Scuka's Quote of the Day:

*".....I was wounded and went back to England, and there was a great crowd of people when the ship came in. All of a sudden, somebody says this: The Canadians! They've taken Vimy! Nobody did it before! And what a cheer went up...they threw flowers. In fact, I broke down and cried. We achieved something that nobody had done before. I think myself that was where Canada was born....."*

**A.E. Wright  
"Flanders Fields"  
Script #9**